

**AMENDMENTS TO THE CLAIMS**

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) An electric field sensor comprising:

a light source;

an electro optic crystal which is applied with an electric field based on a signal under test, in which a birefringent index changes according to the electric field, and which changes a polarization state of light incident from said light source according to the birefringent index and emits the light;

a detector that detects an electric signal according to the change of the polarization state of the light emitted from said electro optic crystal;

a first electrode that is provided close to said electro optic crystal, and that applies the electric field based on the signal under test to said electro optic crystal;

a second electrode that is provided close to said electro optic crystal, thereby forming a pair with said first electrode; and

an auxiliary electrode that is electrically connected to said second electrode, ~~and that forms a capacitance with ground.~~

wherein a capacitance between said auxiliary electrode and a ground is larger than a capacitance between said first electrode and said second electrode.

2. (Previously Presented) The electric field sensor according to claim 1, wherein a surface area of said auxiliary electrode is larger than each surface area of said first electrode and said second electrode.

3. (Previously Presented) The electric field sensor according to claim 2, wherein a shape of said auxiliary electrode is any one of a bar shape, a tabular shape, and a spherical shape.

4. (Previously Presented) The electric field sensor according to claim 1, wherein a distance between said auxiliary electrode and said second electrode is larger than a distance between said first electrode and said second electrode.

5. (Previously Presented) The electric field sensor according to claim 1, further comprising distance changing means for changing a distance between said auxiliary electrode and said second electrode by moving said auxiliary electrode.

6. (Previously Presented) The electric field sensor according to claim 5, further comprising control means for controlling said detector to operate when said distance changing means separates said auxiliary electrode from said second electrode by a predetermined distance or more.

7. (Previously Presented) The electric field sensor according to claim 1, wherein said auxiliary electrode is insulated from a circuit that constitutes said detector and a circuit that drives said light source.

8. - 11. (Canceled)

12. (Previously Presented) An electric field sensor comprising:  
an electro optic crystal which is applied with an electric field based on a signal under test, in which a birefringent index changes according to the electric field, and which changes a polarization state of incident light according to the birefringent index and emits the light;

a polarizing beam splitter that transmits a P polarized light component of the light having the changed polarization state which is emitted from said electro optic crystal, and that reflects an S polarized light component of the light, thereby splitting said light having the changed polarization state into the P polarized light component and the S polarized light component;

a first quarter wave plate that converts the P polarized light component into a circularly polarized light;

a second quarter wave plate that converts the S polarized light component into a circularly polarized light;

a first photo detector that converts the P polarized light component, which is converted into the circularly polarized light by said first quarter wave plate, into an electric signal; and

a second photo detector that converts the S polarized light component, which is converted into the circularly polarized light by said second quarter wave plate, into an electric signal,

wherein a part of the circularly polarized light reflected from a light receiving surface of said first photo detector passes through said first quarter wave plate to be converted into the S polarized light, which is then reflected from said polarizing beam splitter, and a part of the circularly polarized light reflected from a light receiving surface of said second photo detector passes through said second quarter wave plate to be converted into the p polarized light, which passes through said polarizing beam splitter so that the circularly polarized light reflected from the light receiving surfaces of said first and second photo detectors is prevented from returning toward said electro optic crystal.

13. - 34. (Canceled)